

**IN THE DRAWINGS:**

The attached sheets of drawings include changes to FIG. 1. These sheets, which include FIG. 1, replace the previous drawing sheets, including FIG. 1.

**REMARKS**

Claims 1 through 11, and 14 through 39 are currently pending in the application.

This amendment is in response to the Office Action of April 5, 2005.

**Objection to Drawings**

Applicant asserts that the drawing corrections to drawing FIG.1 of the present application clearly comply with the provisions of 37 CFR § 1.83(a) such that drawing FIG. 1 clearly includes the subject matter of claims 27 through 32, 38, and 39. Applicant asserts that the drawing correction to drawing FIG. 1 clearly complies with the provisions of 35 U.S.C. § 132 as no new matter has been introduced into the disclosure of the invention. Applicant asserts that the drawing corrections to drawing Fig. 1 are clearly supported by the specification as page 6, lines 7 through 11 thereof.

Applicant requests entry of the corrections to drawing FIG. 1.

**35 U.S.C. § 112 Claim Rejections**

Claims 27 through 32, 38 and 39 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

Applicant asserts that claims 27 through 32, 38, and 39 clearly comply with the written description requirement of 35 U.S.C. § 112, first paragraph. Applicant has amended the claimed invention to particularly point out and distinctly claim the subject matter of the invention to comply with the provisions of 35 U.S.C. § 112. Applicant asserts that, as presently amended, independent claim 27 clearly describes the Applicant's invention to convey to one skilled in the relevant art that the inventor had possession of the invention at the time the application was filed. Applicant asserts that presently amended independent claim 27 claim clearly stating that an element of the invention comprises "a metallic paddle having no electrical leads for connection to a semiconductor die secured to the second surface of the semiconductor die, the metallic

paddle being attached to at least one side rail by at least a plurality of paddle support bars that include one of being used as a lead and not being used as a lead and being attached to a plurality of cross members by the support bars of a paddle frame”. Such an element of the invention is set forth in the specification on page 6, lines 7 through 11, and in drawing FIGS. 1 through 3. The specification states on page 6, lines 7 through 11, that “Generally, no leads for electrical conduction are provided, although one or more of the paddle support bars 24, 28 may be used as leads in certain specific instances. No narrow ‘leads’ common in lead frames are required in the paddle frame 12, resulting in greater ease of manufacture and increased reliability.” Additionally, in drawing FIGS. 1 through 5, no narrow leads are illustrated but, rather only

paddle support bars 24, 28 are illustrated which may or may not be used as electrical leads separate and distinct from any narrow common electrical leads.

Therefore, Applicant asserts that presently amended claims 27 through 32, 38, and 39 clearly comply with the provisions of 35 U.S.C. § 11, first paragraph. Accordingly, claims 27 through 32, 38, and 39 are allowable under the provisions of 35 U.S.C. § 112.

Claims 27 through 32, 38 and 39 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant has amended the claimed invention of claim 27 to particularly point out and distinctly claim the subject matter of the invention to comply with the provisions of 35 U.S.C. § 112, second paragraph. Applicant asserts that, as presently amended, independent claim 27 clearly describes the Applicant's invention to convey to one skilled in the relevant art that the inventor had possession of the invention at the time the application was filed. Applicant asserts that presently amended independent claim 27 claim clearly stating that an element of the invention comprises "a metallic paddle having no electrical leads for connection to a semiconductor die secured to the second surface of the semiconductor die, the metallic paddle being attached to at least one side rail by at least a plurality of paddle support bars that include one of being used as a lead and not being used as a lead and being attached to a plurality of cross members by the support bars of a paddle frame". Such an element of the invention is set forth in the specification on page 6, lines 7 through 11, and in drawing FIGS. 1 through 3. The specification states on page 6, lines 7 through 11, that "Generally, no leads for electrical conduction are provided, although one or more of the paddle support bars 24, 28 may be used as leads in certain specific instances. No narrow 'leads' common in lead frames are required in the paddle frame 12, resulting in greater ease of manufacture and increased reliability."

Additionally, in drawing FIGS. 1 through 5, no narrow leads are illustrated but, rather only paddle support bars 24, 28 are illustrated which may or may not be used as electrical leads separate and distinct from any narrow common electrical leads. Applicant asserts that such a description of the invention as set forth in presently amended independent claim 27 clearly complies with the provision of 35 U.S.C. § 112, second paragraph, to particularly point out and

distinctly claim the Applicant's invention. Therefore, presently amended claims 27 through 32, 38, and 39 are allowable under the provisions of 35 U.S.C. § 112, second paragraph.

**35 U.S.C. § 103(a) Obviousness Rejections**

Obviousness Rejection Based on Nakashima et al. (U.S. Patent No. 5,661,086) and Fujimoto et al. (U.S. Patent No. 5,773,896)

Claims 1 through 4, 14 through 17, 25 through 30, 38 and 39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakashima et al. (U.S. Patent No. 5,661,086) and Fujimoto et al. (U.S. Patent No. 5,773,896). Applicant respectfully traverses this rejection, as hereinafter set forth.

Applicant asserts that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure.

Turning to the cited prior art, Nakashima teaches or suggests a method for producing semiconductor devices in which a train of metal substrates 12 are connected by a pair of side rails 31, first connecting tabs 32, and second connecting tabs 31. (Abstract, col. 8 lines 20-31) A circuit substrate 17 having an opening 18 at the central portion thereof is adhered to each metal substrate 12. The opening 18 is aligned with a die mounting region 11 of the metal substrate 12, defining a cavity for accommodating the semiconductor die 14. (col. 28-33) Conductive leads 21 are arranged on the front surface of the circuit substrate 17 such that the conductive leads 21 encircle the opening 18. Each conductive lead 21 is provided with a wire bonding pad 19 on the inner end thereof and a terminal pad 20 at an outer end thereof. Bonding wires 25 connect the wire bonding pads 19 with corresponding electrode pads 13 formed in the semiconductor die 14. (col. 6, lines 59-67)

Fujimoto teaches or suggests a semiconductor device including a first semiconductor chip and a second semiconductor chip smaller in size than the first semiconductor chip and connected to the first semiconductor chip by face down bonding. The respective centers of the first and second semiconductor chips are offset from each other. (Abstract)

Applicant asserts that any combination of the Nakashima reference and the Fujimoto reference fails to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of claims 1 through 4, 14, through 17, 25 through 30, 38, and 39 because any such combination of the cited prior art fails to contain any suggestion or any motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the Nakashima reference or to combine the reference with the teachings of Fujimoto reference. Applicant asserts that “Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) A *prima facie* case of obviousness will not be established without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). In this instance, when considering claims 1 through 4, 14 through 17, 25 through 30, 38 and 39, there is no objective reason for the combination of the Nakashima and Fujimoto references. Applicant further asserts that there is no reasonable expectation of success in the combination of references.

Claim 1 recites a semiconductor device assembly including “at least one projection connected to at least one bond pad of the plurality of bond pads on the active surface of the semiconductor die *for flip-chip bonding to a substrate*, the at least one projection including one of at least one solder ball and at least one solder bump; and a paddle frame of a plurality of paddle frames including a pair of side rails, a plurality of cross-members, and a plurality of generally centrally positioned paddles, the pair of side rails and the plurality of cross members connected to a generally centrally positioned paddle of the paddle frame by a plurality of paddle support bars, the second surface of the semiconductor die being secured to the paddle, the paddle being attached to the side rail by at least two of the plurality of paddle support bars and being

attached to the cross members by at least two of the plurality of support bars.” Emphasis added. Nakashima fails to teach or suggest a projection including one of at least one solder ball and at least one solder bump connected on the active surface of a semiconductor die for flip-chip bonding to a substrate. There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the Nakashima reference or to combine the reference with the teachings of Fujimoto.

As previously discussed, Nakashima teaches or suggests a die 14 to be adhered to die mounting region 11 of metal substrate 12, and the circuit substrate 17 is provided with an opening 18 aligned with the die mounting region 11. The protrusion of the semiconductor die 14 from the cavity is restricted. (Nakashima, col. 6 lines 26-40; see also FIG. 1) Applicants submit that there is no motivation to modify the bonding wires 25 connected with electrode pads 13 formed in the semiconductor die 14 with the bumps of solder taught by Fujimoto. The bonding wires 25 of Nakashima connect the semiconductor die 14 with the circuit substrate 17. The semiconductor die 14 is accommodated by a cavity defined by the opening 18 in the circuit substrate 17. Therefore, bumps of solder could not facilitate connection between the semiconductor die 14 and the circuit substrate 17 of Nakashima. It has been proposed that it would have been obvious to combine the product of Fujimoto with the product of Nakashima because it would facilitate electrical connection to a second semiconductor chip. However, there is no suggestion or motivation to modify the semiconductor device of Nakashima to even include a second semiconductor chip, or to facilitate electrical connection to a second semiconductor chip. Further, if the projection 22 of the Fujimoto reference is used to modify the wire bond 25 of the Nakashima et al. reference, the Nakashima et al. reference is destroyed as there is no way to make a connection between the semiconductor device 14 and the metal substrate 12. As such, Applicant asserts that the Nakashima et al. reference and the Fujimoto et al. reference clearly teach away from any combination thereof.

Applicant further asserts that there is no reasonable expectation of success from the modification of Nakashima to facilitate electrical connection to a second semiconductor chip. The die 14 of Nakashima is taught to be mounted in die mounting region 11 of metal substrate 12 such that potting resin 26 is “sufficiently lower than the solder ball 24 [on circuit substrate 17] in

height so that the solder balls 24 can sufficiently protrude downwardly to be reliably connected with the PWB,” the printed wiring board circuit. (Nakashima, col. 7, lines 25 through 28; see FIG.1) A second semiconductor chip bonded to the die 14 with bumps of solder would cause potting resin 26 to protrude downwardly from solder balls 24, preventing reliable connection with the PWB. Therefore, there can be no reasonable expectation of success from the combination of the teachings of Nakashima and Fujimoto.

Additionally, with respect to the claimed invention of independent claim 14, Applicant further asserts that any combination of Nakashima and Fujimoto fails to teach or suggest the claim limitation calling for “a metal paddle from a paddle frame having no narrow common electrical leads for connection to the semiconductor die of a plurality of paddle frames connected by a pair of rails having a plurality of cross members therebetween . . . the paddle support bars not used for electrical leads for the semiconductor die.” Applicant asserts that any rejection of the presently claimed invention of presently amended independent 14 is simply a hindsight reconstruction of the invention by picking and choosing features of the claimed invention based solely upon Applicant’s disclosure. Fujimoto clearly has narrow common electrical leads having bond wires extending therefrom while Nakashima is attached to a substrate.

Accordingly, Applicant asserts that the references cannot and do not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed inventions of claims 1 through 4, 14 through 17, 25 through 30, 38 and 39. Therefore, claims 1, 14, and 27, as proposed to be amended herein, are allowable, as well as dependent claims 2 through 4, 15 through 17, 25, 26, 28 through 30, 38, and 39 therefrom.

Obviousness Rejection Based on Nakashima et al. (U.S. Patent 5,661,086) and Fujimoto et al. (U.S. Patent 5,773,896) as applied to claims 1-4, 14-17, 25-30, 38 and 39, and further in combination with applicant’s admitted prior art

Claims 5, 6, 18, 19, 31 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakashima et al. (U.S. Patent 5,661,086) and Fujimoto et al. (U.S. Patent 5,773,896) as applied to claims 1 through 4, 14 through 17, 25 through 30, 38 and 39, and further



in combination with applicant's admitted prior art. Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicant asserts that claims 5, 6, 18, 19, 31 and 32 are each allowable as depending from allowable independent claims.

In summary for the reasons set forth herein, Applicant asserts that claims 1 through 11, and 14 through 39 are clearly allowable under 35 U.S.C. § 112 and over the cited prior art.

Applicant requests the allowance of claims 1 through 11, and 14 through 39 and the case passed for issue.

Respectfully submitted,



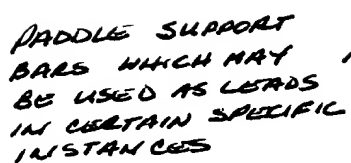
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JRD/dlm:lmh

Attachment: Replacement Sheet  
Annotated Sheet Showing Changes

Document in ProLaw



**Fig. 1**